

John Deere

CASE
SUMMARY

12



JOHN DEERE FOUNDRY

Waterloo, Iowa
Black Hawk County

Intern: Angela Jacobson
Major: Mechanical Engineering
School: Iowa State University



The Company

John Deere Foundry produces gray cast iron and ductile iron castings for transmission cases, rear axle hubs, wheels, and other agricultural equipment accessories. The Foundry employs about 300 people and is one of several John Deere operations in the Waterloo/Cedar Falls area. The Foundry currently has an ambitious recycling program that covers office paper, cans, cardboard, scrap metal, wood/pallets, batteries and aerosol cans. Other on-site beneficial reuse projects for foundry sand, slag, and refractory brick have diverted several thousand tons from the landfill and saved more than \$1 million in disposal costs.

Project Background

The Foundry recently implemented a personal protection equipment (PPE) recycling program. The intern was asked to determine the cost savings and landfill reduction associated with the program. The intern also followed up on some recommendations made by an audit team the previous year, specifically a reduction in pump energy usage.

Incentives to Change

John Deere is dedicated to continuous improvement in environmental responsibility. Even though the Foundry is currently recycling a large portion of its waste streams, they are always looking for further ways to reduce landfill tonnage. Any efforts that bring the Foundry closer to becoming a zero-waste facility are welcome.

The Foundry by its nature consumes large quantities of energy. Most of this energy usage is imperative to the operations of the foundry, but even small reductions in energy consumption could significantly reduce greenhouse gas emissions, demand from local power company, and Foundry spending.

Results

Comparing the price of new protection equipment to the price of cleaning each item shows a savings of 70 percent on average over the cost of new items. In the first three months of the program, the equipment the Foundry has recycled is worth about \$15,000. A summary of spending from Accounting shows that since the recycling program was introduced, safety spending has dropped by about 25 percent. At this



business

academia

rate, the Foundry will save about \$24,000 per year on safety spending. The program also eliminates about 8,000 pounds of solid waste per year.

The intern compiled and organized the information in PowerPoint presentation format for use within the company. Presentations were made by the intern to all wage employees at the

Foundry, as well as for John Deere's Corporate Green Steering Committee and Corporate Safety Standardization team. Feedback from the presentations suggests that there is interest in carrying the glove-recycling program to several other Deere facilities.



Currently the Foundry cooling water is circulated by two separate well water loops. Each pump is rated to handle 2,000 gallons a minute, but with current equipment demands each pumps only about half that amount. If the cooling loops were connected in parallel, one pump could run both loops. Savings from shutting off one pump, including energy demand, energy usage, and production savings, are

estimated at \$35,610 per year. The intern updated maps of the current well water loops, gathered flow data into the loops, identified areas where water could be shut off, and re-searched the implementation cost of the project.

Finally, lighting and compressed air energy savings were researched. Foundry lighting costs nearly \$500,000 each year. The Foundry floor is uniformly lit, even though lighting needs are not the same in all areas. The intern found that light levels in several areas on the floor exceeded recommended levels by 200-400 percent and recommended removing select bulbs in over-lit areas. Estimated savings come to \$15,000 per year. Using skylights or dual reflectors on existing lighting could cut lighting spending by \$150,000 per year or more; these options are recommended for further investigation. The intern also looked at fluorescent lighting usage and identified areas frequently lit while unoccupied. If lights are turned off over equipment no longer in use and occupancy sensors and timers are installed, the Foundry could realize an additional \$9,650 per year in energy savings. A consultant was recommended to assist the Foundry with better programming controls on its three air compressors. Reducing compressor venting to the atmosphere is estimated to be worth about \$40,000 per year.

Project Summary Table

Opportunity	Resource conserved	Savings	Status
PPE recycling	8,000 lbs/yr from landfill	\$24,000/yr	Continued at Foundry, recommended to be implemented at other Deere facilities
Pump energy conservation	136 million gal water 966,000 kWh/yr	\$35,610/yr	Implementation in progress
Turning off lights	821,000 kWh/yr	\$24,650/yr	To be implemented
Reprogramming compressed air controls	1,333,000 kWh/yr	\$40,000/yr	Recommended
Skylights or dual reflectors	5 million kWh/yr	\$150,000/yr	Further research needed